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10/565,585	01/20/2006	Emmanuel Uzoma Okoroafor	M03B120	2673

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EXAMINER	
WONG, EDNA	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/565,585	OKOROAFOR, EMMANUEL UZOMA	
	Examiner	Art Unit	
	EDNA WONG	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 January 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43* is/are pending in the application.

4a) Of the above claim(s) *5,9,15-23,25 and 27-43* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-8,10-14,24 and 26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

This is in response to the Amendment dated January 6, 2010. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

Response to Arguments

Election/Restrictions

This application contains claims **5, 9, 15-23, 25 and 27-43** drawn to an invention nonelected without and with traverse in the replies filed on June 11, 2009 and September 8, 2009, respectively. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 112

I. Claim **1-4, 6-8, 10-14, 24 and 26** have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The rejection of claims 1-4, 6-8, 10-14, 24 and 26 under 35 U.S.C. 112, second paragraph, has been withdrawn in view of Applicant's amendment.

II. Claims **13 and 14** have been rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of

elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: between the coating and the metallic layer.

The rejection of claims 13 and 14 under 35 U.S.C. 112, second paragraph, has been withdrawn in view of Applicant's amendment.

Claim Rejections - 35 USC § 102

Claims **1-4, 6 and 10** have been rejected under 35 U.S.C. 102(b) as being anticipated by **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No. 2004/0149759 A1).

The rejection of claims 1-4, 6 and 10 under 35 U.S.C. 102(b) as being anticipated by WO 02/088593 ('593) and Moser et al. has been withdrawn in view of Applicant's amendment.

Claim Rejections - 35 USC § 103

I. Claims **1-4, 6, 10 and 12-14** have been rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No. 2004/0149759 A1) in view of **Kurze et al.** (US Patent No. 5,811,194).

The rejection of claims 1-4, 6, 10 and 12-14 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over WO

02/088593 ('593) and Moser et al. in view of Kurze et al. has been withdrawn in view of Applicant's amendment.

II. Claim **7** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No. 2004/0149759 A1) as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of **JP 54-31479** ('479).

The rejection of claim 7 under 35 U.S.C. 103(a) as being unpatentable over WO 02/088593 ('593) and Moser et al. as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of JP 54-31479 ('479) has been withdrawn in view of Applicant's amendment.

III. Claim **8** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No. 2004/0149759 A1) as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of **RU 2,026,890** ('890).

The rejection of claim 8 under 35 U.S.C. 103(a) as being unpatentable over WO 02/088593 ('593) and Moser et al. as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of RU 2,026,890 ('890) has been withdrawn in view of Applicant's amendment.

IV. Claim **11** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No. 2004/0149759 A1) as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of **Wu et al.** ("Effect of Polishing Pretreatment on the Fabrication of Ordered Nanopore Arrays on Aluminum Foil by Anodization", *J. Vac. Sci. Technol.*, Vol. B 20(3), May/June 2002, pp. 776-782).

The rejection of claim 11 under 35 U.S.C. 103(a) as being unpatentable over WO 02/088593 ('593) and Moser et al. as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of Wu et al. has been withdrawn in view of Applicant's amendment.

V. Claim **24** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No. 2004/0149759 A1) as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of **WO 02/25113** and **Hasert et al.** (US Patent No. 6,655,937 B2).

The rejection of claim 24 under 35 U.S.C. 103(a) as being unpatentable over WO 02/088593 ('593) and Moser et al. as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of WO 02/25113 and Hasert et al. has been withdrawn in view of Applicant's amendment.

VI. Claim **26** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No.

2004/0149759 A1) as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of **Schoener et al.** (US Patent No. 4,647,347).

The rejection of claim 26 under 35 U.S.C. 103(a) as being unpatentable over WO 02/088593 ('593) and Moser et al. as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of Schoener et al. has been withdrawn in view of Applicant's amendment.

Response to Amendment

Claim Rejections - 35 USC § 112

Claims **1-4, 6-8, 10-14, 24 and 26** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1

lines 3-4, recite "is selected from the group of metals including". The alternative expression of the Markush group is improper. One acceptable form of alternative expression, which is commonly referred to as a Markush group, recites members as being "selected from the group consisting of A, B and C." See *Ex parte Markush*, 1925 C.D. 126 (Comm'r Pat. 1925). It is improper to use the term "comprising" instead of "consisting of." Ex parte Dotter, 12 USPQ 382 (Bd. App. 1931) [MPEP § 2173.05(h)].

The transitional term "comprising", which is synonymous with "*including*", "containing", or "characterized by", is inclusive or open-ended and does not excludes additional, unrecited elements or methods steps (MPEP § 2111.03).

Claim 13

lines 1-2, "the coating comprising the metallic layer and the sintered ceramic oxide layer" lacks antecedent basis.

Claim Rejections - 35 USC § 103

I. Claims **1-3, 6, 8 and 12-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Chan** (US Patent Application Publication No. 2004/0247904 A1) in view of **Kurze et al.** (US Patent No. 5,811,194).

Chan teaches a method of forming a coating on a plastics substrate comprising the steps of:

• applying a metallic layer to the plastic substrate (= by way of simple PVD method, an aluminum alloy may first be deposited onto the surface of the substrate) wherein the metallic layer is selected from the group of metals including at least magnesium, titanium, tantalum, zirconium, niobium, hafnium, tin, tungsten, molybdenum, vanadium, antimony, bismuth, and alloys of the aforementioned metals (= an aluminum alloy including aluminum and at least one other metal, e.g. such refractory metals as titanium (Ti), zirconium (Zr), hafnium (Hf), vanadium (V), niobium (Nb) and tantalum (Ta)) [page 2, [0020]]; and

• subjecting the metallic layer to electrolytic oxidation, wherein the metallic layer is anodically charged (= this layer of aluminum alloy is converted into oxides of aluminum, including e.g. Al_2O_3, and oxides of the other metal, e.g. TiO_2, by anodic

oxidation) [page 2, [0020]] and immersed in an aqueous electrolytic solution (= the electrolytic solution of anodic oxidation includes phosphoric acid, sulphuric acid and oxalate salts) [page 3, [0033]] for forming at least a ceramic oxide layer on the metallic layer (= this layer of aluminum alloy is then converted into oxides of aluminum, including e.g. Al_2O_3, and oxides of the other metal, e.g. TiO_2) [page 2, [0020]].

The group of metals further includes aluminium (= an aluminum alloy) [page 2, [0020]].

The metallic layer is deposited on the substrate (= by way of simple PVD method) [page 2, [0020]].

The metallic layer comprises a thickness less than 100μm (= the aluminum alloy layer is of a thickness of 0.5 to 20 microns) [page 2, [0020]].

The metallic layer is formed on a second metallic layer (= an interfacial layer comprising at least principally of chromium) [page 4, claim 13] previously applied to the substrate (= wherein step (c) is carried out before said step (a) and step (b)) [page 4, claim 12].

The coating comprising the metallic layer and the ceramic oxide layer has a thickness less than 100μm (= said matrix is of a thickness of substantially 0.5 to 20 microns) [page 4, claim 19].

The thickness is less than 50μm (= said matrix is of a thickness of substantially 0.5 to 20 microns) [page 4, claim 19].

The method of Chan differs from the instant invention because Chan does not disclose the following:

a. Wherein the electrolytic oxidation is *an electrolytic plasma oxidation*, as recited in claim ***1***.

b. Wherein the ceramic oxide layer is a sintered ceramic oxide layer, as recited in claim ***1***.

c. Wherein *the electrolytic plasma oxidation* is performed at a pH from 7 to 8.5, as recited in claim ***12***.

Chan teaches that:

> In a solid substrate surface-treated in accordance with a method according to the present invention, a matrix of hard aluminum oxide and soft oxide of, e.g. a refractory metal will form, creating a buffering effect, and rendering the coating very resilient. Experiments indicate that after an aluminum substrate coated with a 3-micron aluminum oxide/titanium oxide coating has been subjected to *bending* of 90^{o} or even 180^{o} for over 50 times, no crack or crevice was evident upon observation via a 100x microscope. The present invention can thus be applied on substrates of all shape forms (pages 2-3, [0028]).

Like Chan, ***Kurze*** teaches the anodic oxidation of aluminum alloys (col. 2, lines 15-32). Kurze teaches a plasma-chemical anodic oxidation (col. 1, lines 13-18). The electrolytic plasma oxidation is performed at a pH from 7 to 8.5 (= a pH value of 2 to 8) [col. 2, lines 25-26]. Kurze teaches that oxide ceramic layers which have a substantially greater thickness of up to 150 μm, are resistant to abrasion and corrosion and have *a high alternating bending strength* (col. 2, lines 10-14).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the electrolytic oxidation described by Chan with

(a) to (c) above because a plasma-chemical anodic oxidation would have produced an oxide ceramic layer not only having high alternating bending strength but also having resistance to abrasion and corrosion as taught by Kurze (col. 2, lines 10-32).

II. Claims **4 and 10** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Chan** (US Patent Application Publication No. 2004/0247904 A1) in view of **Kurze et al.** (US Patent No. 5,811,194) as applied to claims 1-3, 6, 8 and 12-14 above, and further in view of **Johner et al.** (US Patent No. 6,029,571).

Chan and Kurze are as applied above and incorporated herein.

The method of Chan differs from the instant invention because Chan does not disclose the following:

a. Wherein *the metallic layer is sprayed* on the substrate, as recited in claim ***4***.

b. Wherein the substrate comprises an epoxy-carbon fibre composite or fibre reinforced plastics material, as recited in claim ***10***.

Chan teaches:

By way of simple *PVD method*, an aluminum alloy, i.e. an aluminum alloy including *aluminum* and at least one other metal, e.g. such refractory metals as *titanium (Ti)*, zirconium (Zr), hafnium (Hf), vanadium (V), niobium (Nb) and tantalum (Ta), may first be deposited onto the surface of the substrate (page 2, [0020]).

Like Chan, ***Johner*** teaches depositing a layer of an aluminum alloy on the surface of a plastic substrate having a shaped form. Johner teaches applying a layer of Al-Ti alloy on a hollow cylindrical body made of a plastic material, which may be fiber-

reinforced (col. 3, lines 37-39). The layer is applied by *thermal spraying, physical vapor deposition (PVD)*, chemical vapor deposition (CVD), plasma chemical vapor deposition or galvanizing (col. 4, lines 50-58).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the metallic layer and substrate described Chan with wherein the metallic layer is sprayed on the substrate; and wherein the substrate comprises an epoxy-carbon fibre composite or fibre reinforced plastics material because thermal spraying a layer of Al-Ti alloy on a body made of a fibre reinforced plastics material would have been functionally equivalent to physical vapor depositing (PVD) a layer of Al-Ti alloy on a body made of a plastic material as taught by Johner (col. 4, lines 50-58).

Furthermore, a plastic material which is fiber-reinforced would have meant a plastic material that was strengthened with fibers.

III. Claim **7** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Chan** (US Patent Application Publication No. 2004/0247904 A1) in view of **Kurze et al.** (US Patent No. 5,811,194) as applied to claims 1-3, 6, 8 and 12-14 above, and further in view of **JP 54-31479** ('479).

Chan and Kurze are as applied above and incorporated herein.

The method of Chan differs from the instant invention because Chan does not disclose wherein *the substrate is roughened* prior to applying the metallic layer thereto,

as recited in claim **7**.

Chan teaches plastics substrates (page 2, [0020]).

JP '479 teaches physically roughening the surface of the plastic structure and spraying molten metal (e.g., Al, Zn, etc.) on the roughened surface of the structure to form a metal coating film (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the substrate described by Chan with wherein the substrate is roughened prior to applying the metallic layer thereto because roughening the plastic structure would have created anchoring holes to anchor a metal coating film to the plastic structure as taught by JP '479 (abstract).

IV. Claim **11** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Chan** (US Patent Application Publication No. 2004/0247904 A1) in view of **Kurze et al.** (US Patent No. 5,811,194) as applied to claims 1-3, 6, 8 and 12-14 above, and further in view of **Wu et al.** ("Effect of Polishing Pretreatment on the Fabrication of Ordered Nanopore Arrays on Aluminum Foil by Anodization", *J. Vac. Sci. Technol.*, Vol. B 20(3), May/June 2002, pp. 776-782).

Chan and Kurze are as applied above and incorporated herein.

The method of Chan differs from the instant invention because Chan does not disclose wherein the method further includes the step of *smoothening the metallic layer* prior to the step of subjecting the metallic layer to electrolytic plasma oxidation, as

recited in claim ***11***.

Wu teaches that in order to get porous anodic aluminum oxide with perfect hexagonal-packed cells, electropolishing of Al foils has been conducted to obtain a smoother surface before anodization (page 776, "I. Introduction").

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Chan with wherein the method further includes the step of smoothening the metallic layer prior to the step of subjecting the metallic layer to electrolytic plasma oxidation because electropolishing the aluminum would have obtained a smoother surface for producing a porous anodic aluminum oxide with perfect hexagonal-packed cells as taught by Wu (page 776, "I. Introduction").

V. Claim **24** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Chan** (US Patent Application Publication No. 2004/0247904 A1) in view of **Kurze et al.** (US Patent No. 5,811,194) as applied to claims 1-3, 6, 8 and 12-14 above, and further in view of **WO 02/25113** and **Hasert et al.** (US Patent No. 6,655,937 B2).

Hasert is the English equivalent of WO 02/25113.

Chan and Kurze are as applied above and incorporated herein.

The method of Chan differs from the instant invention because Chan does not disclose wherein the substrate is a component of *a vacuum pump*, as recited in claim ***24***.

Chan teaches that the present invention can thus be applied on substrates of all shaped forms (col. 5, lines 24-25).

Hasert teaches that:

The vane **15** has formed-on terminal parts **22** and **23**, *which comprise a high-temperature-resistant thermoplastic such as polyaryletherketone (PEEK), or a material of comparable properties*. This plastic, optionally modified with a specially assembled combination of fillers, has a wear resistance and a low coefficient of friction (col. 2, lines 38-43).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the substrate described by Chan with wherein the substrate is a component of a vacuum pump because terminal parts on a vane for a vane cell vacuum pump would have been comprised of a high-temperature-resistant thermoplastic which are modified with fillers, and have a wear resistance and a low coefficient of friction as taught by Hasert (col. 2, lines 38-43).

VI. Claim **26** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Chan** (US Patent Application Publication No. 2004/0247904 A1) in view of **Kurze et al.** (US Patent No. 5,811,194) as applied to claims 1-3, 6, 8 and 12-14 above, and further in view of **Schoener et al.** (US Patent No. 4,647,347).

Chan and Kurze are as applied above and incorporated herein.

The method of Chan differs from the instant invention because Chan does not disclose wherein the method further comprises the step of applying to the metallic layer subjected to electrolytic plasma oxidation a layer formed from at least one metal

selected from the group consisting of *Mo, Ni, Cr and W*, as recited in claim ***26***.

Schoener teaches sealing anodized aluminum and alloys thereof in a sealant bath comprised of nickel ion (col. 3, lines 1-46).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Chan with wherein the method further comprises the step of applying to the metallic layer subjected to electrolytic plasma oxidation a layer formed from at least one metal selected from the group consisting of Mo, Ni, Cr and W because nickel would have sealed anodized aluminum and alloys thereof as taught by Schoener (col. 3, lines 1-46).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDNA WONG whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edna Wong/
Primary Examiner
Art Unit 1795

EW
April 10, 2010